



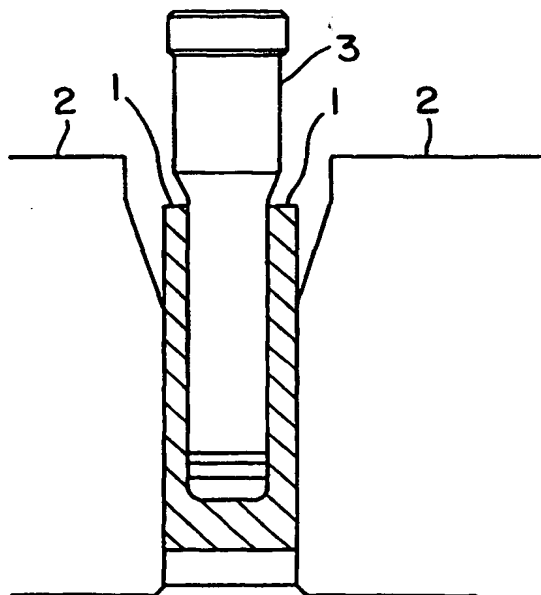
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C25D 11/36, C23C 28/00		A1	(11) International Publication Number: WO 00/15879
			(43) International Publication Date: 23 March 2000 (23.03.00)
(21) International Application Number: PCT/US99/21117 (22) International Filing Date: 13 September 1999 (13.09.99) (30) Priority Data: 10/258765 11 September 1998 (11.09.98) JP 11/206973 22 July 1999 (22.07.99) JP (71) Applicant (for all designated States except US): HENKEL CORPORATION [US/US]; Suite 200, 2500 Renaissance Boulevard, Gulph Mills, PA 19406 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): KOBAYASHI, Naoyuki [JP/JP]; 2761-48 A901 Obatakitayama, Moriyama-ku, Nagoya-shi, Aichi-ken 463-0011 (JP). MORIYAMA, Atsushi [JP/JP]; 1-301 No. 201 Nakahita Tenpaku-ku, Nagoya-shi, Aichi-ken 468-0014 (JP). (74) Agent: HARPER, Stephen, D.; Henkel Corporation, Suite 200, 2500 Renaissance Boulevard, Gulph Mills, PA 19406 (US).		(81) Designated States: CA, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	

(54) Title: METHOD FOR FORMING A LUBRICATIVE FILM FOR COLD WORKING

(57) Abstract

A phosphate conversion coating of 6 to 20 g/m² is formed on a metal substrate, using an electrolytic solution containing zinc ions, phosphate ions, and an auxiliary acid, preferably nitric acid, and passing an electric current, with the substrate serving as the cathode, for a few seconds through the substrate, the electrolyte solution, and a counterelectrode. This provides a method for forming a lubricative film suitable for cold working without generating any sludge and at a high level of productivity. Lubrication performance may be checked by means of a backward punching test. The dies (2) are set to bind the circumference of the cylindrical test specimen (1) and the specimen is then subjected to a downward stroke from a punch (3).



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon		Republic of Korea	PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		